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SCIENCE NEWS LETTER

Vol. 50, No. 26

THE WEEKLY SUMMARY OF CURRENT SCIENCE • DECEMBER 28, 1946

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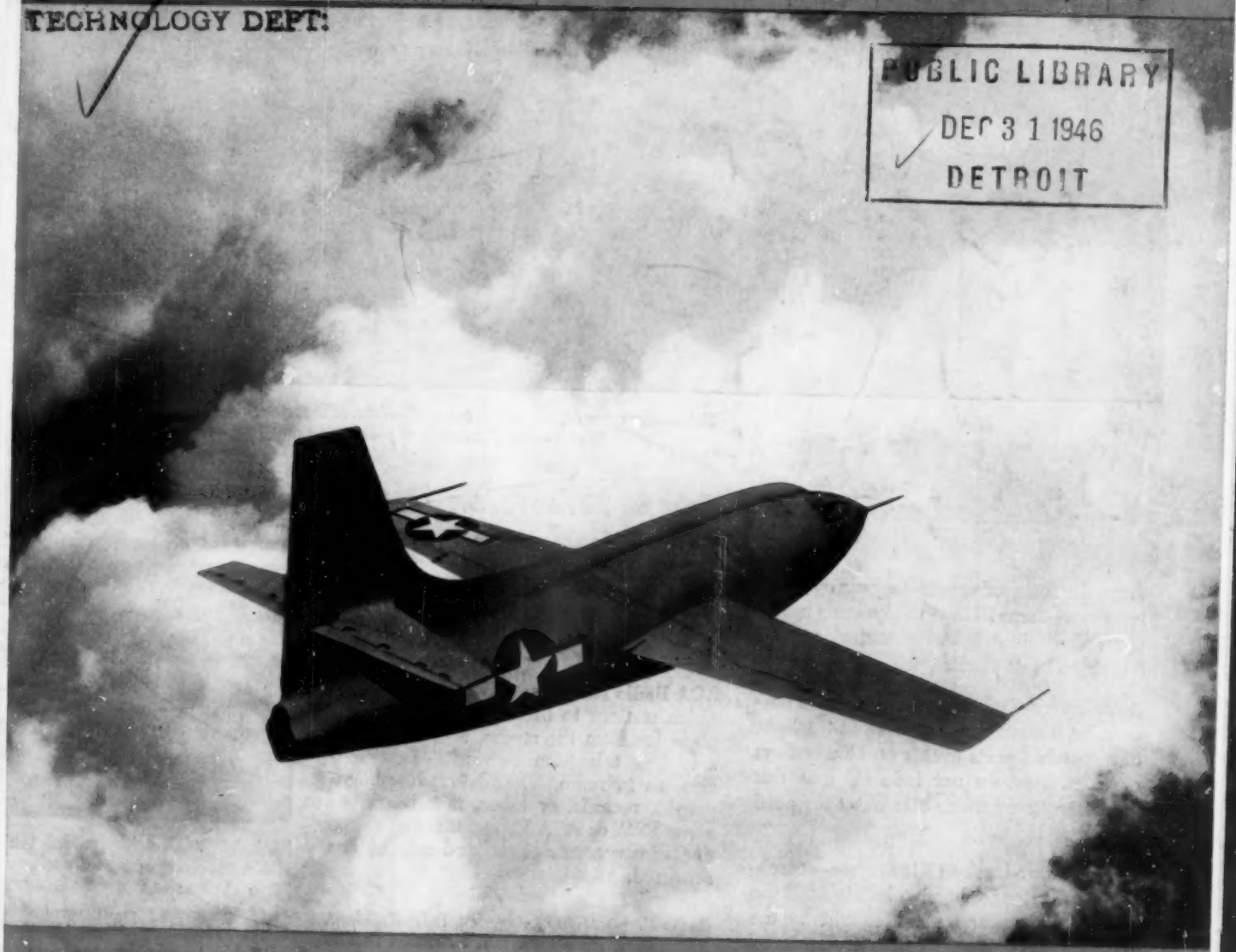

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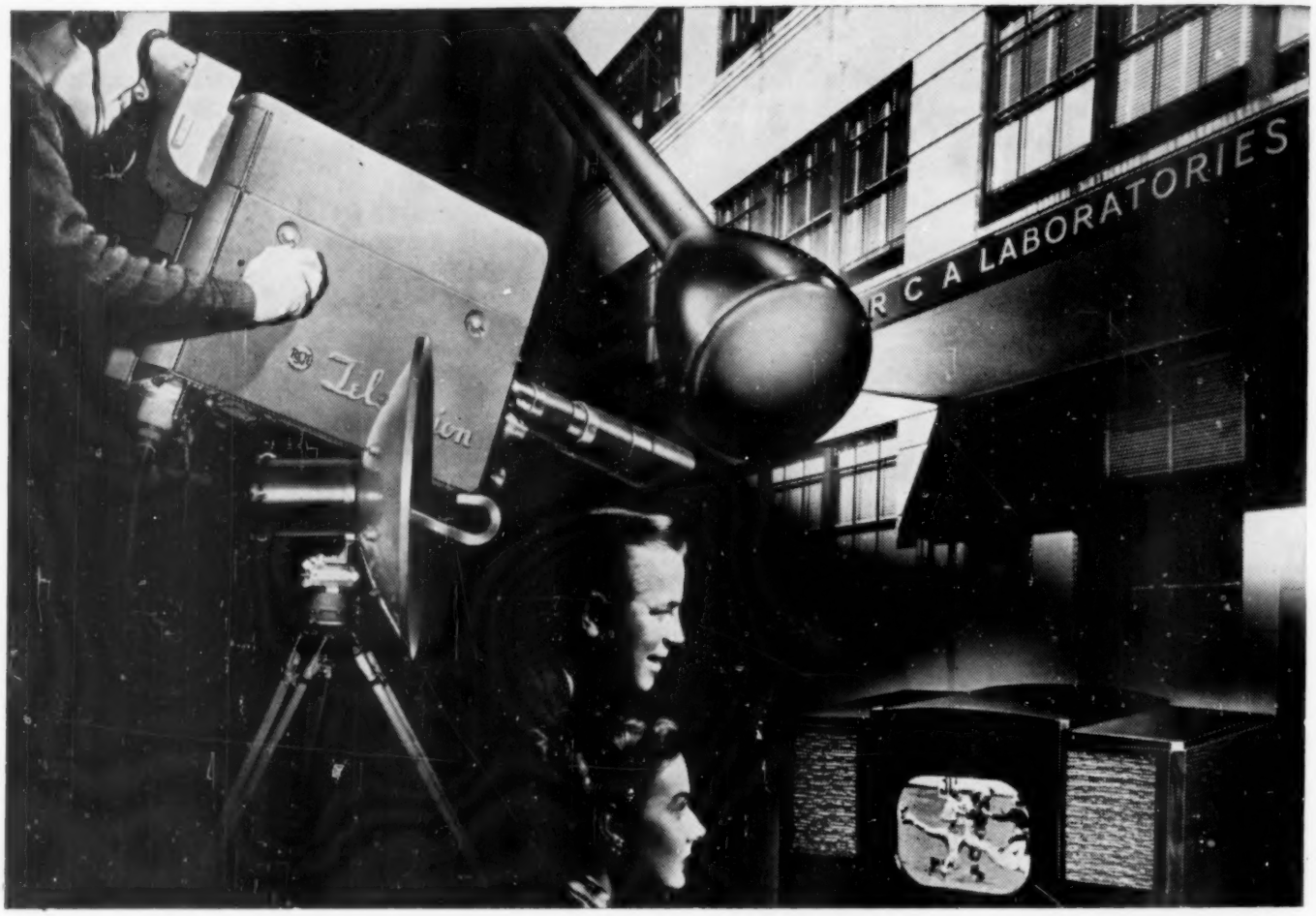
1921 TWENTY-FIFTH ANNIVERSARY 1946



Television camera, receiving tube, all-electronic receiver and radio relay equipment —are the result of pioneering and research at RCA Laboratories.

Behind every big stride in Television– RCA Laboratories!

From the scene of action—to your own living room—these RCA developments based upon research at RCA Laboratories mean *television at its finest:*

RCA Image Orthicon Camera sees whatever the human eye sees, even in the light of a match! Sports events on cloudy days or in twilight do not fade because this super-sensitive camera eliminates the need for strong lighting.

RCA Mirror-backed Kinescope—searchlight brilliance for home television. All the lifelike realism and detail caught by the RCA Image Orthicon Camera is reproduced by this new receiving tube that loses none of the original brilliance.

RCA Victor Television Receiver—with the new RCA exclusive "Eye Witness" feature that "locks" the picture, keeps it bright, clear—as steady as a picture on the wall.

RCA Radio Relay equipment enables television stations to broadcast events taking place far from the studio, and eventually may link television networks. In television, as in radio, Victrola* radio-phonographs, records, or tubes, if it bears the name RCA or RCA Victor, it is one of the finest instruments of its kind science has achieved.

. . .

Radio Corporation of America, RCA Building, Radio City, New York 20 . . . Listen to The RCA Victor Show, Sundays, 2:00 P. M., Eastern Time, over NBC. *"Victrola" T. M. Reg. U. S. Pat. Off.

RCA VICTOR table model television receiver with the exclusive "Eye Witness Picture Synchronizer" that assures you *brighter, clearer, steadier* pictures. It is now available in some areas—see your local RCA Victor dealer.

RADIO CORPORATION of AMERICA

MEDICINE

Lucite Tubes Mend Aorta

Plastic segments are stitched with specially braided silk to artery carrying blood directly from heart. Rubber balloon holding mercury may save intestines from gangrene.

➤ A NEW KIND of spare part for the human body, tubes of lucite, the modern plastic, may be used by surgeons of the future to repair the big artery that carries blood directly from the heart.

This possibility appears from experiments reported by Dr. Charles A. Hufnagel of Boston at the meeting of the American College of Surgeons.

Segments of this big artery, called the aorta, measuring one to three centimeters long were replaced by highly polished lucite tubes in animals. The tubes were held in place by stitches of specially braided silk.

These spare parts were still firmly united to the rest of the artery six months later. The artery with its lucite tube section functioned satisfactorily in carrying blood, and no drugs, such as heparin or dicoumarin, were needed to prevent clotting of the blood.

An inch and a half long rubber balloon with a little mercury in it may save lives of patients threatened by peritonitis and gangrene of the intestines. The balloon is put up the patient's nose and down his throat, through the stomach and all the way down the intestines, if necessary. It is attached to a long rubber tube with several holes in it near the balloon end. Object of the tube is to enable the surgeon to suck out through it fluid and semisolid material which a cancer or some other obstructing condition may prevent passing in the normal way.

The use of mercury in such tubes was developed by Dr. Meyer O. Cantor of Detroit. The weight of the mercury and even more its tendency to run together makes it ideal, he believes, for carrying the tube along the up and down course of the intestines.

The object of this and other methods for removing the obstructed material is to prevent its cutting off circulation in the walls of the intestines, following which gangrene may set in. With the material removed, the surgeon can safely operate to correct the underlying cause of the obstruction.

Prevention rather than salvage is the new order in surgery for future battlefields and for civilian injuries and disasters, Dr. Edward D. Churchill of Boston declared.

This is the chief, and so far little discussed, surgical lesson from the war that ended with the atom bomb explosions over Japan. By studying the pattern of injury, such as was seen in the atom bomb explosions, in the Coconut Grove fire in Boston and in other disasters, surgeons will be able to devise methods of preventing injury.

Much is already known about how weapons injure and how wounds from various types of weapons are distributed. If these facts are applied to development of body armor, such as flak suits, the number of those killed in action might be reduced by 12% and of those wounded by 8%, according to figures quoted by Dr. Churchill. The development of the crash helmet of the British army by a neurosurgeon is another example cited for the possibilities of preventive rather than salvage surgery.

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MATHEMATICS

Particle Energy Tackled

➤ A COMPLEX mathematical struggle to explain how primary particles of the universe can escape the necessity of having infinite energy has won for a 28-year-old physicist from Ceylon, Dr. Jayaratnam Eliezer, the $2,000 Mayer Award administered by the National Science Fund of the National Academy of Sciences.

A high-powered award jury pronounced the 35-page, equation-filled contribution a "profound and comprehensive treatment" of the major problem of the interaction of particles with an electromagnetic field. What place the prize paper will have in the final solution of the problem, the committee is not sure.

The dilemma that Dr. Eliezer attempts to solve is that modern physics does not allow primary particles to have a space structure, but that as soon as a particle is assumed to be point-like its self-energy becomes infinite. Classical physics has ways to get around these infinities, but quantum theory finds it more difficult. That is the problem attacked.

Dr. Eliezer is now a research fellow at Christ's College, Cambridge, England, where he had previously studied with Prof. P. A. M. Dirac, one of the founders of modern physics.

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CHEMISTRY

Carbon 13 Is Available For Cancer Research

➤ AVAILABILITY of carbon isotope 13, first shipped by Kodak Research Laboratories to New York's Memorial Hospital, will make it possible for research scientists to tag the carbon on two sides of a chemical or physiological reaction.

This may speed understanding of what happens in cancer, which is the main research problem at Memorial Hospital. The new carbon variety weight 13, produced by a chemical exchange method, supplements the radioactive carbon 14 made in the chain reaction atomic pile at Oak Ridge, distributed for research a few months ago.

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IN THE MAKING—Carbon 13 is being made in the fractionating column. Dr. William O. Kenyon (right) of the Kodak Research Laboratories is holding a bottle containing some of the rare isotope used in medical research.

GHOSTLY FOSSIL—X-rays reveal the pattern of fish bones embedded in shale slab. Photograph by Fred Anderegg, Princeton, N. J.

PALEONTOLOGY

X-Rays Detect Fossils

► X-RAYS are being used in the laboratories of Princeton University to study the fossils of hundreds of small fish found embedded in a shale deposit when excavations were being made for the University's new library building. This novel use of X-rays not only saves many hours of tedious scraping and brushing ordinarily used to lay bare rock-embedded fossils, but it brings out fine details of the bony structure that the usual technique fails to disclose.

When a slab of shale suspected of harboring a fossil is split, the faint outlines of a fish may appear on the freshly exposed surface. Instead of going on with the chip-scrape-and-brush technique, the slab is then placed on a film holder and exposed to X-rays. When the film is developed the entire skeleton shows up in minute detail. Usually the head is strongly outlined, with the body bones, fins and tail in ghostly tracery.

With only a few exceptions, the fossils found in the Princeton campus excavation are of a species known scientifically as *Osteoplaurus newarki*, belonging to the ancient order of fishes called the coelacanths. The specimens are all small, ranging from one to eight inches in length. One prominent characteristic in which they differ from modern fishes is a third lobe projecting from the middle of the forked tail. Their scales seem to have been covered with sharp prickles—doubtless making them uncomfortable morsels for bigger fish to swallow.

These fish lived far back in the Triassic period, towards the end of the Age of Dinosaurs, when what are now layers of shale and related rocks underlying New Jersey's present low hills were soft mud on the bottom of the sea. Fish that died sank to the bottom, were covered with more mud; then more fish died and still more mud covered them, until there was a vertical layer-cake of death. Still deeper burial and resulting heavier pressure, continued for ages, hardened the mud strata into layers of shale, with the now fossilized remains of the fish sandwiched between them.

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MEDICINE

Health Centers for Lepers

► LEPERS won't be treated like lepers when recommendations of the advisory committee on leprosy to the U. S. Public Health Service go into effect. And the 2,000 to 3,000 lepers now roaming at large will be found and given the benefit of modern effective treatment for the disease.

The National Leprosarium at Carville, La., should be replaced by four Public Health Service special treatment centers, the committee advised at the close of its two-day session.

The special treatment centers for leprosy should be located, one each, in California, Texas, Florida and Louisiana, the four states where leprosy is endemic and seems to flourish. With these centers, and efforts made to give lepers outpatient treatment, using segregation only as a last resort, patients with leprosy will be able to follow more normal lives.

Relaxation of the 29-year-old restrictions on interstate travel of lepers is also advised. This and some other of the committee's recommendations cannot be put into effect without new legislation, it was pointed out. Existing regulations should be codified and published for the benefit of lepers and the general public, the committee recommended.

Good results now obtained with the modern drug, promin, in treatment of leprosy and recognition that leprosy is not as contagious as once believed are the basis for the recommendations.

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SCIENCE NEWS LETTER
Vol. 50 **DECEMBER 28, 1946** *No. 26*

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566, and 360 N. Michigan Ave., Chicago, STate 4439.

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AERONAUTICS

Delta-Wing Plane Design

Triangular platform is being studied for planes flying at supersonic speeds. Basic rules of aerodynamics are different for supersonic planes.

➤ A TRIANGULAR platform called the delta-wing is being studied as a possible design for planes flying at supersonic speeds, Dr. Th. von Karman, director of the Daniel Guggenheim School of Aeronautics at the California Institute of Technology, revealed in the Institute of Aeronautical Sciences tenth annual Wright Brothers Memorial lecture.

A derivation of the sweepback wing, the delta-wing has been described as looking like the paper airplanes you used to make in school with a fuselage through the middle.

Speaking on the 43rd anniversary of the famous flight by the Wright Brothers, Dr. von Karman said the delta-wing has considerable theoretical interest, "since, in the case of delta wings with certain simple angle of attack distributions, the direct problem of the wing theory can be solved in a relatively easy way."

Outlining the mathematical possibilities of delta-wing design in supersonic flight, Dr. von Karman reported, "The final answer on the practical merit of the delta wing will be given by further comprehensive theoretical and experimental investigations."

It was learned that the National Advisory Committee for Aeronautics has the delta wing under study.

When man approaches the speed of sound with air speeds of 600 to 760 miles per hour, the basic rules of aerodynamics change and new rules control flight, the lecturer declared.

"The basic rules of supersonic aerodynamics are entirely different from the basic rules of subsonic aerodynamics," Dr. von Karman said, explaining how new propulsion devices with powerful thrust and new design concepts have disproved the older theory that crashing the "barrier" of sonic speed was impossible.

Dr. von Karman listed three new rules that will affect flight at supersonic as the rule of forbidden signals, the zone of action and zone of silence, and the rule of concentrated action.

Forbidden signals, he described as the fact that pressure changes produced by a body moving with speed faster than sound cannot reach points ahead of the body.

In zone of action and zone of silence, a point sound source moving faster than sound restricts all action to the interior of a theoretical cone. Outside this cone is the zone of silence.

Changes in the distribution of pressure effects at supersonic speeds compared with speeds below the velocity of sound waves differ under what Dr. von Karman terms "the rule of concentrated action."

"We are at the stage when this branch of aerodynamics should cease to be a collection of mathematical formulas and half digested facts . . . and be considered by the aeronautical engineer as a necessary prerequisite to his art," the lecturer said.

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ELECTRONICS

New Automatic Machine Analyzes Brain Waves

➤ FIRST DEMONSTRATION in this country of a new automatic brain wave analyzer was made recently by its inventor, W. Grey Walter, Bristol, England, at the Eastern Association of Electroencephalographers meeting in Boston.

Dr. Walter claims the new analyzer will be useful in diagnosis of brain tumors and aid in the detection of mental conditions which develop into dangerous behavior irregularities. The electronic machine can tune in on 24 separate frequencies and record the impulses consecutively. It is hooked up in tandem with a standard encephalograph so that while the impulses are recorded in black ink, the analysis is recorded in red ink on the same tape.

Electroencephalographs measure the minute electrical current generated by the billions of cells in the human brain. The new instrument is designed to reduce the hours of time needed to analyze the chart which records the currents on a standard instrument.

Dr. Frederick Gibbs of the University of Illinois Psychiatric Institute said that the new analyzer failed to take account of wave forms which appear for extremely short intervals and may be clinically important. Other scientists at the Boston demonstration believed that the invention might be valuable as a supplement to existing instruments and as a research tool.

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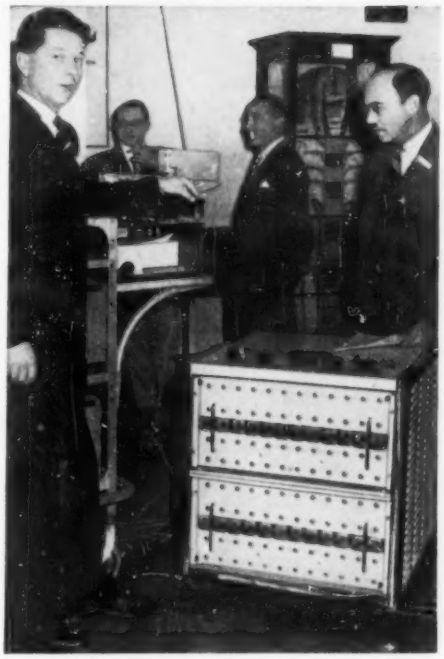

MECHANICAL PSYCHIATRIST ***—W. Grey Walter, left, explains his new brain wave analyzer to Dr. Robert S. Schwab, assistant neurologist at Massachusetts General Hospital.***

EMBRYOLOGY

Youngest Human Embryo Only Four Days Old

➤ A HUMAN embryo only about four days old, counting from the date when the egg it started from was discharged from its mother's ovary, has been obtained by Dr. Arthur T. Hertig of the Harvard Medical School and added to the Carnegie Institution's collection of human embryos.

This embryo is the first and only authenticated one so far obtained before attachment to the uterus in the mother's body. It is in the stage of segmentation and consists of several cells. Because some of these have more than one nucleus and because the cells are of unequal size, it is believed that the embryo was diseased and would not have developed into a normal, healthy baby.

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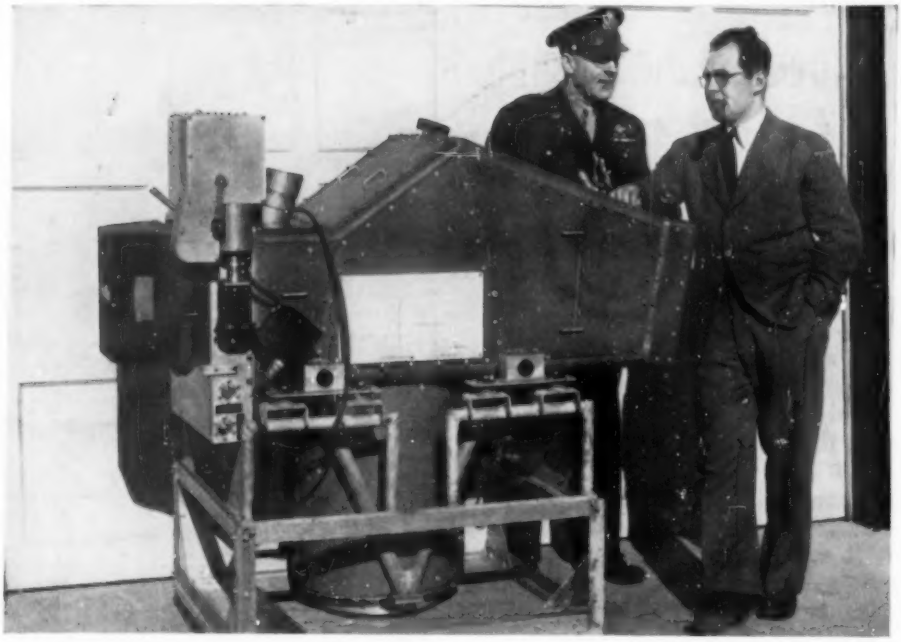

AERIAL PHOTOGRAPHY—The giant 200-inch lens camera developed by the Army Air Forces at Wright Field takes pictures from 30,000 feet in the air.

AERONAUTICS

Rocket Engine Powers XS-1

Engine has four units, each of which produces a static thrust of 1,500 pounds. Alternate engine will be used in tests of plane, in attempt to fly faster than sound.

See Front Cover

➤ POWER for the Army's Bell XS-1, a plane designed to beat the speed of sound, will be provided by rocket engines built by Reaction Motors, Inc., it was revealed to the American Rocket Society by Harry W. Burdett of that company. The U. S. Army Air Forces picture on the cover of this SCIENCE NEWS LETTER shows the Bell XS-1 in flight.

The plane, now at the Army Muroc Flight Test Base, California, has proved its air-worthiness as a glider after being towed aloft by other aircraft and released at high altitudes. It has now been tested under its own power at medium speeds; later the attempt will be made to travel faster than sound, 760 miles at sea level.

The plane is designed to fly at a top speed of 1700 miles an hour at an altitude of 80,000 feet. It is not a military airplane, but a piloted flying research laboratory to determine the effect of transonic and supersonic speeds on an aircraft. It is the product of a cooperative program of the Army Air Forces, Bell Aircraft Corporation, and the National Advisory Committee for Aeronautics.

The details of the rocket engine for the XS-1 were not revealed by Mr. Burdett. He did, however, describe a similar engine built for the U. S. Navy. This is the Reaction Motors model 1500N4C which is a 6,000-pound thrust engine operating on liquid oxygen and a mixture of ethyl alcohol and water. It is constructed of welded stainless steel and weighs less that 210 pounds.

The Army states, however, the XS-1 engine consists of four units, each of which produces a static thrust of 1,500 pounds. Power output is controlled by selection of the number of cylinders to be fired at the same time.

In the first tests to be made under its own power, an engine of alternate design will be used, the Army states. The original power plant requires a fuel system wherein alcohol and oxygen are forced into the burner chambers by a specially designed turbo pump. In the alternate design, a pressurized system is employed, with gaseous nitrogen being used to force the liquid oxygen and alcohol into the burners. As a consequence, the XS-1 with the alternate engine can operate at full 6,000-pound thrust for only 2.5 minutes.

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ASTRONOMY

Amateur Star-Lovers Form National Organization

➤ AMATEUR star-lovers from almost all parts of the country have united together in a national organization, the first of its kind in the country. This federation of amateur societies will be known as the Amateur Astronomers League.

The organization is expected to promote the science of astronomy and to encourage and coordinate the activities of amateur astronomical societies. It is believed that the league will foster observational and computational work, and opportunities for craftsmanship in the various fields of astronomy. It will provide a medium for correlating amateur activities with professional research.

At the convention of amateur astronomers in Detroit last summer it was suggested that a nation-wide federation of amateur astronomers be formed. In accordance with plans made at that time, the proposed by-laws were submitted to all known organizations, and came into being when 10 organizations accepted the by-laws.

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BIOLOGY-MATHEMATICS

Paris Doctorates Given Two Americans

➤ TWO AMERICAN scientists were honored with the prized degree of Doctor Honoris Causa by the University of Paris at the celebration of that institution's 50th anniversary of its reorganization. Those receiving the degree were:

Dr. Herbert M. Evans, director of the institute for experimental biology of the University of California, discoverer of the growth hormone and vitamin E.

Dr. Marston Morse, professor of mathematics at the Institute for Advanced Study, Princeton, N. J., who is known for his theory of analysis in the large.

Other Americans holding this degree are Dr. Albert Einstein and Dr. Robert A. Millikan.

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ASTRONOMY

Saturn Is Coming Closest

Only planet to appear in the skies in January, ringed planet shines brightly. Stars of Orion are prominent high in the south. Moon to be in conjunction with Saturn on Jan. 8.

By JAMES STOKLEY

➤ THOUGH ONLY one planet appears in the evening skies of January, that one —Saturn—has joined the brilliant group of stars in the south and southeast, to make them even more conspicuous. Probably the most familiar of these are the orbs that make up the figure of Orion, the warrior, high in the south, as indicated on the accompanying maps. These depict the appearance of the heavens at 10:00 p.m. around Jan. 1, about 9:00 p.m. in the middle of the month, and an hour earlier at the end.

Orion is easily identified because of the three stars in a row that form the warrior's belt. Above and to the left is Betelgeuse, below and to the right is Rigel, both part of the same group. But above and to the right is another constellation, that of Taurus, the bull, with first magnitude Aldebaran, red in color. Below and to the left of Orion is Canis Major, the great dog, with Sirius, the dog star— brightest star that we can see in the nighttime sky.

Gemini, the Twins

If, starting with Orion's belt, we continue on past Betelgeuse, we come to the constellation of Gemini, the twins, in which shine Castor and Pollux. Below these stars, which, to the Romans, represented two of their favorite gods, is Cancer, the Crab. Like the Gemini, Cancer is a constellation of the zodiac, the series of star groups through which move sun, moon and planets. And that is why at the present time we see Saturn in Cancer, making conspicuous a rather faint constellation. Saturn is now of about zero magnitude on the astronomer's scale, so it is brighter than any of the stars now visible, with the exception of Sirius. In January Saturn and the earth are both in the same direction from the sun, so the two planets are closest—a mere 754,-984,000 miles—which partly accounts for the brilliance of the planet. Also, though they are not visible to the naked eye, Saturn's famous system of rings is now pretty well spread out, so that the sunlight they reflect to us contributes to the overall brightness. Sometimes, when the rings are on edge as we see them, the brightness is much less.

Between Cancer and Orion there is another bright star to be seen. This is Procyon, in Canis Minor, the lesser dog. Another first magnitude star is overhead, in the figure of Auriga, the charioteer. This is named Capella. And there is still another over toward the east—Regulus, in Leo, the lion. At the low height shown, however, it does not shine with its full brightness. Later at night, as it rises higher, it looks brighter.

Two Other Planets

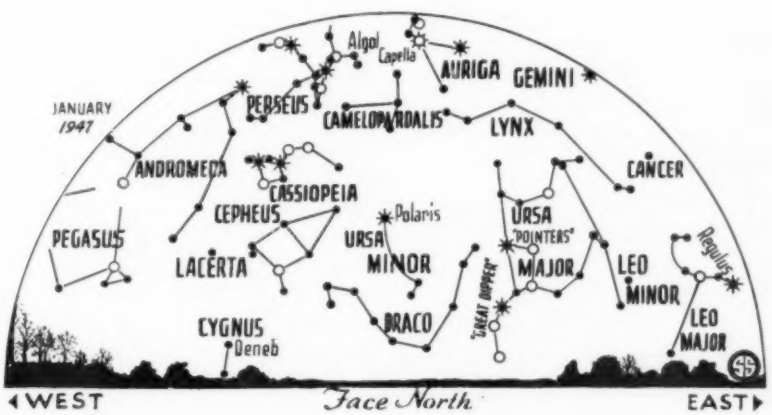
Two other planets can be seen in January if you want to keep late hours. Jupiter, which is nearly as bright as Sirius, in the constellation of Scorpius, the scorpion, just now can be seen low in the southeast about 4:00 a.m. Venus, which is many times brighter still, is in the same constellation and comes up a little later so that both Jupiter and Venus shine gorgeously in the southeastern sky before sunrise. Mercury and Mars cannot be seen this month, as both are on the far side of the sun.

As the moon travels around the sky every month, going through its changing phases, it regularly passes the planets, which move more slowly along a similar path. When this happens we call it a conjunction of the moon and the planet. Thus on Jan. 8 at 7:18 a.m., when we cannot see them, the moon is in conjunction with Saturn. On the night of the seventh the moon appears to the west of the planet, and the following evening we see it to the east. When they are closest, the moon appears about six times its own diameter from Saturn.

Occultation

Sometimes, however, the moon comes squarely in front of a planet or a star. On Jan. 16, when the moon is in conjunction with Jupiter, this happens, and the event is termed an occultation. It is really a kind of eclipse, though that name is usually reserved for an occultation of the sun by the moon, or a passage of the moon into the shadow of the earth.

Jupiter's occultation happens, unfortunately, at an inconvenient time for much of the country. People in the east will be able to observe it only during daylight hours. At Washington the moon, moving eastward, will occult the planet at 7:55 a.m., EST. As the moon will then be a few days past last quarter, the illuminated part will be to the east, and this edge will be the one that covers the planet. At 9:06 a.m. Jupiter will reappear, from behind the dark edge of the moon. Since this will happen in full light, it will be hard to see with the naked eye, but a pair of binoculars or a small telescope will help. The Nautical Almanac Office of the U. S. Naval Observatory, which calculates these times, also computes them for three other places in the nation, one of which is in western Massachusetts, near Pittsfield. Here



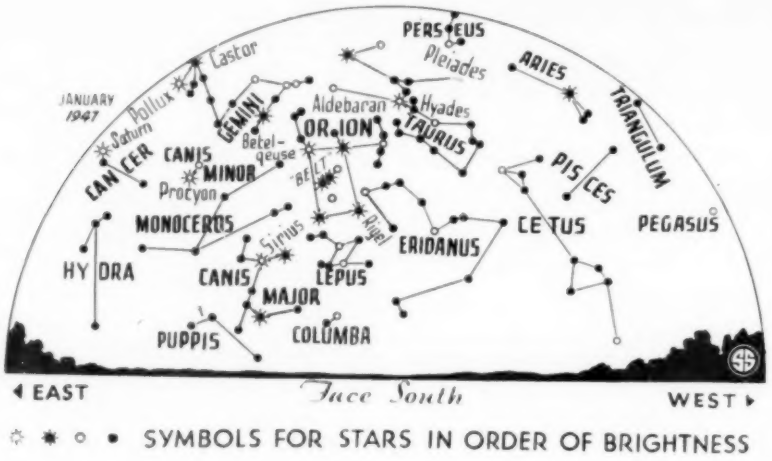
Do You Know?

Most *green plants* retain their carotene, from which the body makes vitamin A, hidden in their leaves, but some transfer part of it to their roots which become yellow vegetables such as carrots.

Worsteds and *woolens* differ in the type of wool fibers used; worsteds are made from tops, the longer fibers combed out of new, or virgin wool, while woolens are made from whole wool or the short fibers.

The dark spaces in the *Milky Way*, once referred to as coal sacks, are now known to be vast clouds of cosmic matter, dust and gas, cutting off our view of star masses beyond them.

Rice growing in the Orient depends largely on hand labor; in the United States rice is seeded from airplanes flying over the rice fields, harvested by the combine-drier method, and handled by machinery.



the planet is hidden at 8:11 a.m., EST, and it comes out again at 9:02.

Farther west the occultation occurs a little sooner, and with the time being earlier conditions are better. For a point in central Illinois, near Quincy, the planet is occulted at 6:02 a.m., CST, before sunrise, and returns to view at 7:44. In the far west it is still better. For the fourth point for which the Naval Observatory makes predictions, a spot in southern California near Bakersfield, the occultation begins at 3:57 a.m., PST, and ends at 4:51, so it will be entirely in the dark.

Celestial Time Table for January

Jan.	EST	
3	9:00 a.m.	Earth nearest sun, 91,468,000 miles
6	3:00 a.m.	Mars behind sun
	9:00 a.m.	Moon nearest, 222,000 miles
	11:47 p.m.	Full moon
8	7:18 a.m.	Moon passes Saturn
13	9:56 p.m.	Moon in last quarter
16	8:25 a.m.	Moon passes (and occults) Saturn
17	10:04 p.m.	Moon passes Venus
18	midnight	Moon farthest, 252,300 miles
22	3:34 a.m.	New moon
23	4:00 a.m.	Mercury behind sun
26	1:00 a.m.	Saturn nearest, 754,984,000 miles
27	10:00 p.m.	Venus farthest west of sun
29	7:07 p.m.	Moon in first quarter

Subtract one hour for CST, two hours for MST, and three for PST.

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Photo courtesy Haverford College

RESISTANCE BOXES FOR STUDENT USE

L&N instruments like those shown above take long and hard use by physics students in their experiments. The resistance boxes are made in 2-, 3- and 4-dial instruments with enclosed switches, and can be used in d-c or low-frequency a-c measurements. D-C resistant change from zero setting, measured across binding posts, equals readings ±(0.1% + 0.01 ohm).

The Adjustable Mica Capacitor has a total capacitance of 1 μf in 5 sections: 0.5, 0.2, 0.2, 0.05, 0.05 μf. Limit of error is ±0.25%.

Further information on request.

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NUCLEAR PHYSICS

World Union Hastened

➤ WORLD UNION has been made more likely because of the advent of atomic power, declares Dr. Vannevar Bush in his annual report as president of the Carnegie Institution of Washington. Admitting that many persons see such a union as a "Roman peace" imposed by the atomic-armed strongest nation on all the rest, he points out that "there is a large and salutary endeavor for a better result—effort for a voluntary joining of states under some scheme of guarantees that will protect minorities.

Nor does he overlook the possibility that a world ethically unready for the yielding of such power may destroy itself before a satisfactory union can be effected. But, he adds, "it is doubtful whether civilization will commit suicide knowing it is doing so, and because of science the race between the power of weapons and the power of understanding is not altogether one-sided."

Popular recognition of the tremendous power of science, intensified by its wartime accomplishments, will bring about strong material support of research in the near future, Dr. Bush is confident. He sees, however, some hazards that must be guarded against. Among them are a too-urgent demand for immediate application, possibility of dictation to science by laymen, over-emphasis on military aspects, and indifference to or ignorance of the cultural and philosophical significance of science.

So far as the Carnegie Institution is concerned, he pledges, "It should and will firmly support fundamental science if there should be a tendency toward the over-applied . . . It will most decidedly emphasize that the pursuit of science for its cultural value remains a thing worthy of men's best effort."

Science News Letter, December 28, 1946

After a careful study a statistician estimates that this year four out of every five *tourists* travel by highway.

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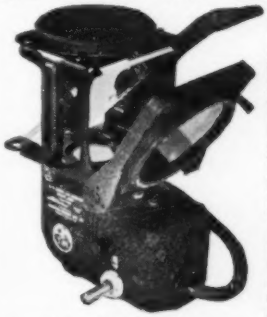

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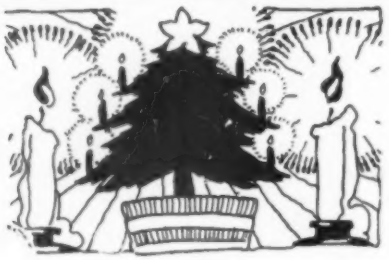
ANTHROPOLOGY

NATURE RAMBLINGS

by Frank Thone



The New Year

➤ NEW YEAR'S DAY is not the same on all calendars. Many peoples reckoned the year as beginning in the spring—ancient Greeks and Romans, for example—and a few even in autumn. But the marking of the new year has always been tied up with one of the four principal points of the sun's apparent path through the heavens: spring and autumn equinoxes, when days and nights are equal in length; summer solstice, when days are longest; and winter solstice, when they are shortest.

It is quite natural to begin the year in spring, when the days have grown long enough to provide warmth and light for germinating seeds and opening buds on vines and fruit trees. Calendars that put New Year's Day on or near the spring equinox are farmers' calendars. It is not without significance that Mars, in whose month (March) the Romans celebrated the coming of their new year, was the god of agriculture as well as the god of war.

It may seem strange, if you stop to think of it, that the calendar of the Christian year, which has come to be that of all Western civilization, should begin when nights are still long and dark, and when the coldest weeks of winter are still to come. But the long nights are not quite so long as they were a couple of weeks before. The winter solstice has been passed; the sun's retreat southward has turned into an advance northward again.

It was this first token of new hope that was the occasion of the old pagan Yuletide feast, with its brave show of evergreen branches, holly, mistletoe, and all the other trappings that have been taken over bodily by ourselves, including the immemorial, somewhat irrational, but thoroughly human custom of showing how glad we are by eating (and perhaps drinking) too much.

There is no written record of the exact date of Jesus' birth, as there is in all the gospels of his crucifixion. We have a hint that it may well have been in winter, because of the anxious need for shelter that sent Joseph and Mary into a stable when there was no room for them in the caravanserai. In selecting this particular time to celebrate the birth of Christ, and his ceremonial acceptance into the Jewish community a week later, the early Church simply took over the ancient pagan feast of hope and gave it a new significance.

Science News Letter, December 28, 1946

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NUCLEAR PHYSICS

Heavy Water to Be Used In British Atomic Research

➤ HEAVY WATER, which Nazi scientists had planned to use as the moderator of atomic energy piles, will be produced for British studies at the Atom Research Station at Didcot. American atomic energy piles have used graphite for the moderator, though it is known that heavy water can be employed.

Chemically, deuterium oxide, heavy water differs from standard water in that the hydrogen atoms in the heavy water molecule are isotopes with an atomic weight of two instead of hydrogen's usual one. Discovery of this heavy isotope of hydrogen won a Nobel prize for the American atomic scientist, Dr. Harold C. Urey, in 1934. There is about one part of heavy water in 6,000 parts of ordinary water.

During World War II, the Nazis had a plant in Norway producing heavy water. The Allied high command suspected the Germans of atomic bomb efforts, and British commandos, in a hazardous raid, destroyed the heavy water plant.

Science News Letter, December 28, 1946

PHYSICS

Record V-2 Shoot Caught Cosmic Rays

➤ THE RECORD V-2 rocket flight to 114 miles from White Sands Proving Grounds, New Mexico, Dec. 17, was highly successful in radioing cosmic ray data from those great altitudes to the John Hopkins Applied Physics Laboratory group under Dr. J. A. Van Allen.

Apparently the rifle grenades which were to fire artificial meteors failed to shoot as scheduled, although astronomers from Palomar and Harvard Observatories and Aberdeen Proving Grounds were ready to photograph the effects.

Weeks of computation and study will be required to analyze the cosmic ray data from the flight.

Science News Letter, December 28, 1946

PHYSICS

Vigorous Attacks Probe Cosmic Ray Mysteries

➤ VIGOROUS attacks on the secrets of cosmic rays will bring new knowledge of these mysterious particles from outer space and basic facts by which to check theories of nuclear forces and interactions between radiation matter, the Committee on Coordination of Cosmic-Ray Investigations predicted. The Carnegie Institution is now supporting in whole or part cosmic ray study at the Department of Terrestrial Magnetism, at the Bartol Research Foundation of the Franklin Institute, Philadelphia, and at New York University.

Science News Letter, December 28, 1946

BIOCHEMISTRY

Lower Fatty Acids Develop Anti-Bacterial Properties

➤ THE LOWER fatty acids, chemical building-blocks of common oils and fats, develop anti-bacterial properties on exposure to light and air, apparently through the splitting of their molecules into still smaller units with their atoms strung in shorter chains. This new information is contained in the report of Dr. H. A. Spoehr and associates, of the Carnegie Institution's division of plant biology. In general, the acids made up of bigger molecules are less effective against bacteria than those of smaller molecular weight.

Science News Letter, December 28, 1946

MEDICINE

Many Deaf Gain Hearing

Fenestration operation is successful "in all respects" for 82% of 623 patients. Usually about half of hearing lost is restored.

➤ MORE THAN 500 formerly deafened persons are now happy with the improved hearing they have since undergoing the fenestration operation on their ears.

These patients, making up 82% of a total of 623, regard their operation as "successful in all respects," Dr. George E. Shambaugh, of Northwestern University Medical School, reported at the meeting of the American College of Surgeons.

Another 4% of the 623 among Dr. Shambaugh's patients who answered a questionnaire consider the operation successful but still wear a hearing aid at times. In another 1% the patient considers the operation a success but the family is doubtful. The results are regarded as a failure by 10.6%, and 1% want to wait longer before saying.

Since the patient's opinion may be influenced by psychological factors, it cannot be taken as the only criterion for evaluating the results of treatment, but should be considered together with objective tests by tuning fork and audiometer.

The fenestration operation almost never restores the hearing to normal, Dr. Shambaugh emphasized. It may be expected to restore about half the hearing that has been lost, provided the patient is suitable for operation. But this much improvement apparently satisfies most patients and generally enables the patient to understand speech better than he did before the operation with his hearing aid.

The hearing improvement present two years after the operation may be regarded as permanent.

The operation, performed for certain cases of deafness due to otosclerosis, may not only provide a permanent opening in the bony growth to allow passage of sound waves but may also in some cases check or delay the degeneration of the hearing nerve in otosclerosis.

Evidence for this has come from patients followed for five to seven years after the operation, but the question cannot be finally answered until a large number of successfully operated patients have been followed for another five to 10 years.

Science News Letter, December 28, 1946

RADIO

'Seeing' Metal Hears Radio

➤ SEEING and hearing became confused in a Johns Hopkins University laboratory recently to produce one of the year's strangest scientific discoveries: a piece of treated metal smaller than a common pin can tune in on radio broadcasts.

Drs. Donald H. Andrews and Chester Clark, with Peggy McEwan, a laboratory technician, were experimenting upon the infra-red bolometer using a strip of superconducting metal. The bolometer is a device developed during the war for "seeing" in the dark. Working with a cryostat, used to cool with liquid hydrogen the bolometer to its point of sensitivity, the investigators made a routine connection with a loud speaker to check on vibrations in the audible range of frequency.

Out of the loudspeaker came the program being broadcast by a local radio station. Changing the temperature of the cryostat tuned in other stations.

A thread-like ribbon of columbium nitride is the heart of the new bolometer "radio," picking up broadcasts at a temperature of about 435 degrees below zero Fahrenheit. Scientific explanation of the strange phenomenon may lie in superconductivity, the sudden drop in resistance of metals as they approach absolute zero in temperature. Dr. Andrews explained that the broadcasts were received only within the narrow temperature zone of transition between normal and super-conducting states of the columbium nitride ribbon.

The Johns Hopkins scientists claim no revolutionary radio development, though experiments with the bolometer are continuing. They say that since the bolometer is so sensitive to infra-red waves, it can also be sensitive to radio waves. The discovery is regarded as a possible explanation for static-like "noise" encountered in other tests with the bolometer.

Science News Letter, December 28, 1946

PHYSIOLOGY

Eggs Colored Inside Before Being Laid

➤ EASTER would be a more appropriate time than New Years Day for this story to break—it was born about four months too soon.

Eggs can be colored inside before they are laid by feeding the hens certain kinds of food, says Clyde Driggers, poultry husbandman at the Florida Experiment Station.

Eggs will have their whites turned pink if the hens are fed on a diet including plants of the mallow family, among which are hollyhocks and the ground-hugging weed known variously as green cheese and cheeseweed. Pink-tinged whites also result if hens are fed on cottonseed meal and the eggs kept in storage for a time. Worth noting is the fact that cotton is another member of the mallow family.

Yolks can be made a darker orange-yellow by feeding yellow cornmeal, alfalfa leaf meal and other items rich in the carotenoid pigments. Too much cottonseed meal will color the yolks a dark olive.

It is also possible to add artificial colors that will tint up the yolks, provided the dyes are fat-soluble.

Science News Letter, December 28, 1946

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Books of the Week

APPLIED ATOMIC POWER—W. S. Smith, A. H. Fox, R. T. Sawyer, H. R. Austin—*Prentice-Hall,* 227 p., illus., $4. Relatively simple explanation of atomic power, including mineral sources, atom-splitting, the development of atomic energy, conversion of atomic energy into mechanical power, and expected industrial benefits.

BASIC MATHEMATICS FOR TECHNICAL COURSES—Clarence E. Tuites—*Prentice-Hall,* 132 p., $5. Material in this book was developed at the Rochester Institute of Technology. One of a series designed for technical institutes and the junior college field.

DDT AND THE INSECT PROBLEM—James C. Leary, Wm. I. Fishbein and Lawrence C. Salter—*McGraw-Hill,* 176 p., illus., $2.50. Facts about the development, application and effectiveness of DDT, written in plain, non-technical language.

ELECTRICAL ENGINEERING: Essential Theory and Typical Applications—Fred H. Pumphrey—*Prentice-Hall,* 369 p., illus., $5.35. A textbook intended for the student specializing in other fields. Emphasis is placed on basic physical concepts rather than on details of the operating characteristics of motors and generators.

FEDERAL LEGISLATION, RULINGS, AND REGULATIONS AFFECTING THE STATE AGRICULTURAL EXPERIMENT STATIONS—*Govt. Printing Office,* 52 p., paper, 15 cents. U. S. Department of Agriculture. Misc. Publ. No. 515.

INDUSTRIAL CARBON: Its Elemental, Adsorptive, and Manufactured Forms—C. L. Mantell—*Van Nostrand,* 472 p., illus., $7.50. A reference manual on carbon, its properties, varieties, methods of manufacture and uses in chemistry, engineering and technology.

INDUSTRIALIZATION OF LATIN AMERICA—Lloyd J. Hughlett, Ed.—*McGraw-Hill,* 508 p., illus., $5. A symposium on Latin American industry, including cement, chemicals, mining, metallurgy, textiles, food packing, power and communications, by 30 business leaders from the United States and Latin America.

LAND MOLLUSCA OF NORTH AMERICA (NORTH OF MEXICO)—Henry A. Pilsbry—*The Academy of Natural Sciences of Philadelphia,* 520 p., illus., $13. Vol. II, Part 1.

PAPER BULLETS—Leo J. Margolin—*Froben Press,* 149 p., illus., $2.50. A brief story of psychological warfare in World War II, which includes many once secret items of Allied operations in the war of words and ideas against both European and Pacific enemies.

PLASTICS: Problems and Processes—Dale Mansperger and Carson Pepper—*Int. Textbook,* 350 p., illus., $3. An orientation book designed to meet needs of students in junior and senior high schools, colleges and universities, and professional people.

PRODUCTION COMES FROM PEOPLE—*Industrial Hygiene Foundation,* 12 p., illus., paper, free. A circular which summarizes the Foundation's current services and activities on behalf of health and technology.

PSYCHIATRIC INTERVIEWS WITH CHILDREN—Helen L. Witmer, Ed.—*Commonwealth Fund,* 451 p., $4.50. Ten typical case studies from conferences in child guidance clinics which show the methods and techniques currently used by psychotherapists.

SPANISH AND ENGLISH RUINS IN JAMAICA—William B. Goodwin—*Meador,* 240 p., illus., $4. A brief history of that tropical paradise since it was discovered by Christopher Columbus, and settled by his son, Don Diego Colon.

Science News Letter, December 28, 1946

BOTANY

Climate Produces New Races in Plants

➤ WHETHER climate produces racial changes in man is still open to dispute; it certainly does produce changes in plants, experiments reported in the Carnegie Institution's yearbook by Dr. Jens Clausen and associates show. The experiments were conducted in the great range of climatic zones presented by the sea-to-mountaintop topography of California, with the common plant known as milfoil or yarrow as guinea-pig. Slips from the same plant, set out in three different climatic zones, produced three botanical races, with very distinct characteristics in stems, leaves and flowers.

Science News Letter, December 28, 1946

EDUCATION

Phonograph Attachment Flashes Words on Cards

➤ PERSONS learning a language from phonograph records are sometimes handicapped by not knowing what the words look like in print. To meet this problem, F. W. Quidas of New York has invented a coding attachment for a phonograph which will cause the corresponding word to be flashed on a card while the machine is sounding it. On this, he was granted patent 2,412,061.

Science News Letter, December 28, 1946

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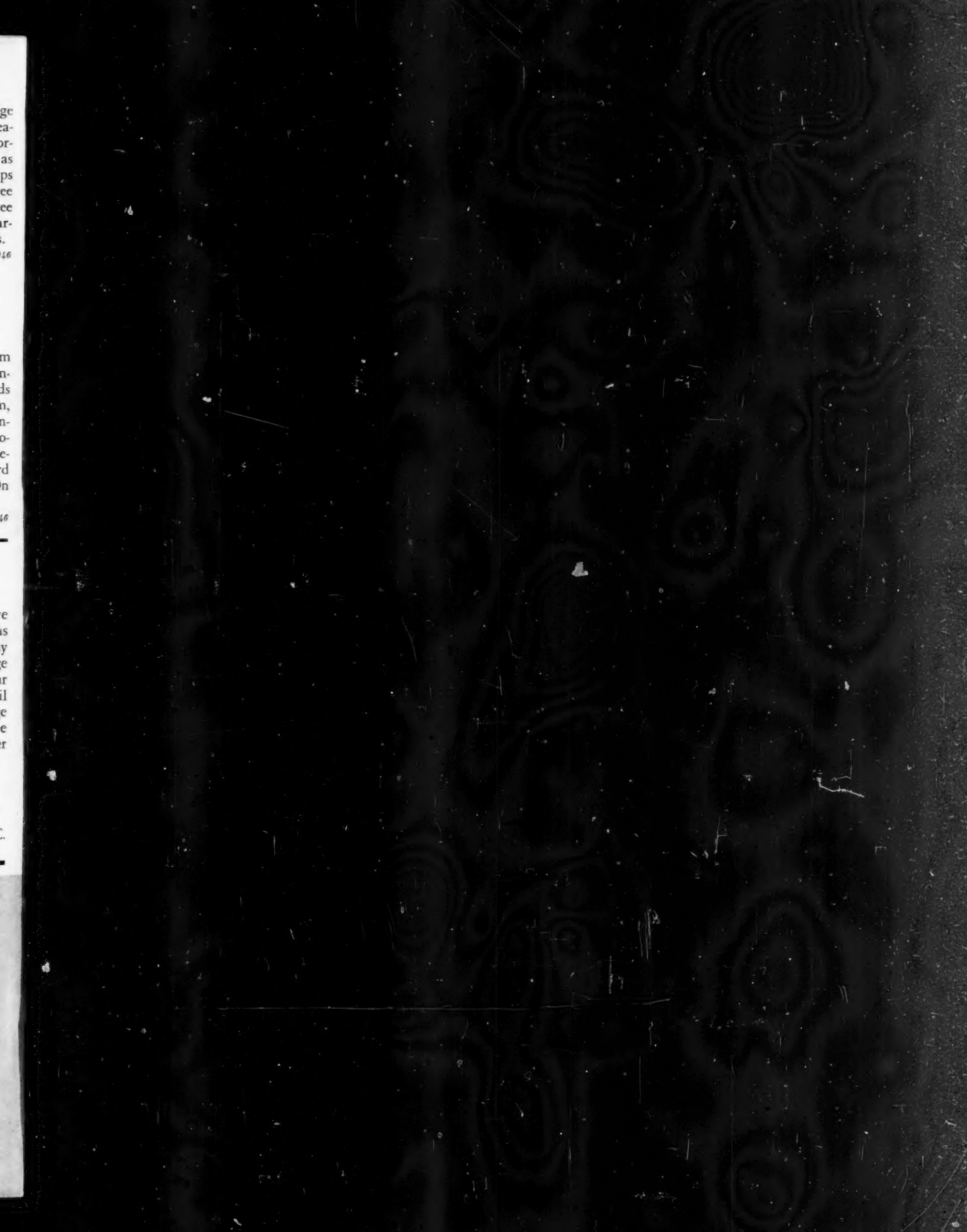
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